PVP 19

Code: 19EC3301

II B.Tech - I Semester – Regular Examinations – MARCH 2021

NETWORK THEORY AND ANALYSIS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place

PART – A

1. a) Find the average value of a cosine wave.
   b) Derive time constant in R-L circuit.
   c) Explain Maximum power transfer theorem.
   d) Define bandwidth and quality factor.
   e) Express h-parameters in terms of Z-parameters.

PART – B

UNIT – I

2. a) A sine wave generator supplies a 500 Hz, 10 V, RMS signal to a 2 KΩ resistor in series with a 0.1 μF capacitor. Determine the total impedance Z and current I. 6 M
   b) A sinusoidal voltage v=50 sin ωt is applied to a series RL circuit. The current in the circuit is given by i=25 sin (ωt-53°).Determine apparent power, average power and power factor. 6 M

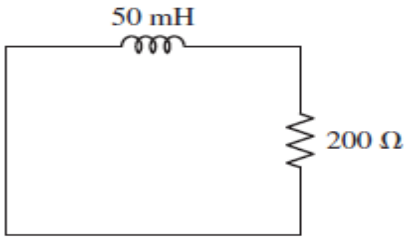
OR

3. a) A sine wave generator supplies a 50 Hz, 50 V, RMS signal to a series RLC circuit with 10 Ω resistor,10 μF capacitor and 0.5 H inductor. Determine the total impedance Z and current I. 6 M

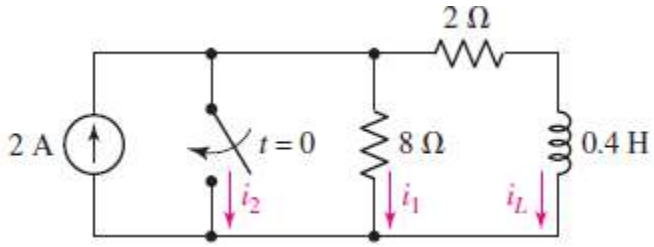
   b) Develop the phase relation between applied voltage and current for series RC excited by sinusoidal voltage and obtain the impedance. 6 M

UNIT – II

4. a) If the inductor of Figure below has a current i_L =2 A at t =0, find an expression for $i_L(t)$ valid for t > 0, and its value at t =200 μs. 4 M

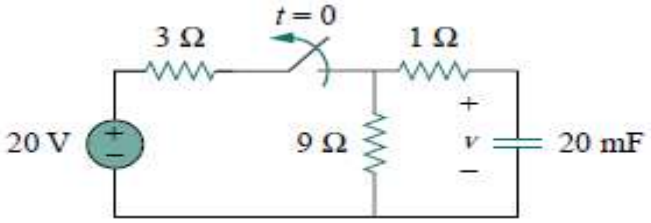


   b) For the circuit of Figure below, find the value of 8 M
   (i) i_L;
   (ii) i_1;
   (iii) i_2. at t=0.15s.



OR

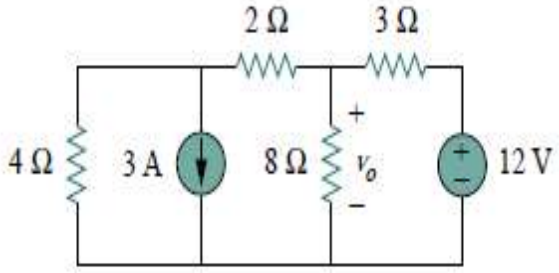
5. a) The switch in the circuit in Figure below has been closed for a long time, and it is opened at t = 0. Find v(t) for t ≥ 0. Calculate the initial energy stored in the capacitor. 6 M



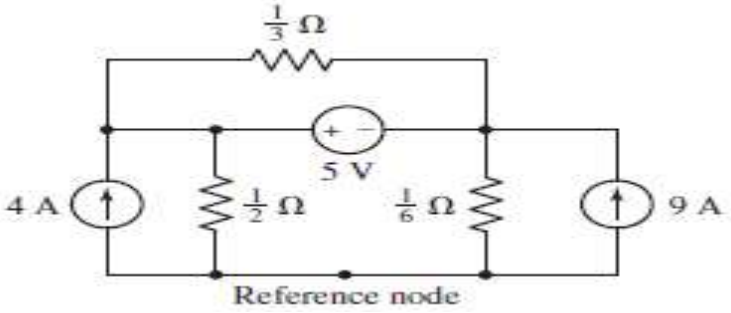
b) A series RC circuit is excited by DC voltage. Evaluate the expression for i(t) when the switch is closed at t=0 and plot i(t) vs. 't'. 6 M

UNIT-III

6. a) Use source transformation to find V_o in the following circuit. 6 M

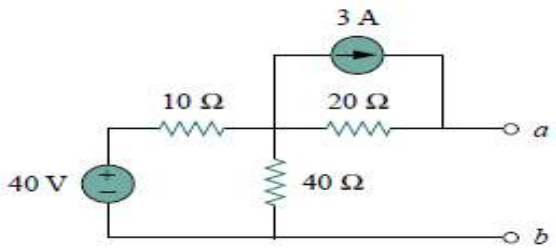


b) Compute the voltage across each resistor in the following figure. 6 M

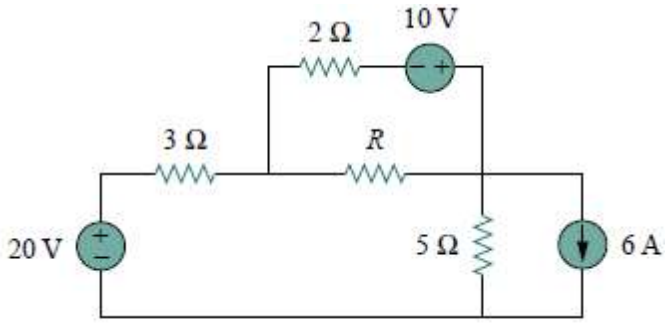


OR

7. a) Find the Thevenin's equivalent at terminals a-b of the circuit. 6 M



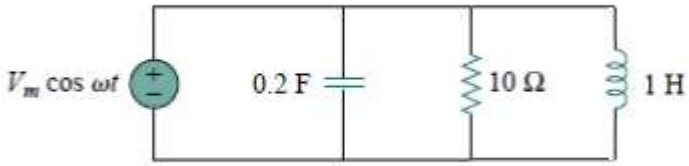
b) Find the maximum power that can be delivered to the resistor R in the circuit below 6 M



UNIT – IV

8. a) Design a series RLC circuit that will have an impedance of 10 Ω at the resonant frequency of ω_o = 50 rad/s and a quality factor of 80. Find the bandwidth. 6 M

b) Calculate the resonant frequency of the circuit in Figure below. 6 M



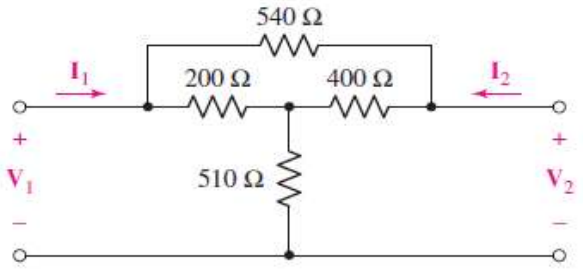
OR

9. a) A series RLC network has R = 2 kΩ &, L = 40 mH, and C = 1 μF. Calculate the impedance at resonance and at one-fourth, one-half, twice, and four times the resonant frequency. 6 M

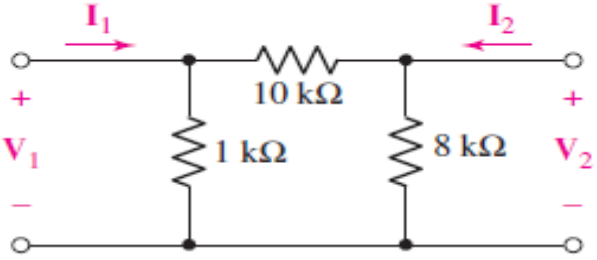
b) A parallel resonant circuit with quality factor 120 has a resonant frequency of 6×10^6 rad/s. Calculate the bandwidth and half-power frequencies. 6 M

UNIT – V

10. a) Obtain a complete set of Y parameters to describe the two-port network as shown below. 6 M



b) Obtain a complete set of h parameters which describe the two-port network as shown below. 6 M



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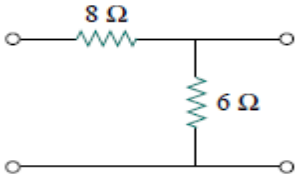
11. a) Find the Z-Parameters for the below two port network. 4 M



b) Find the ABCD-Parameters for the below two port network. 8 M